

PCT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 12 February 2001 (12.02.01)	
International application No. PCT/GB00/02298	Applicant's or agent's file reference AS-4
International filing date (day/month/year) 14 June 2000 (14.06.00)	Priority date (day/month/year) 17 June 1999 (17.06.99)
Applicant STEPHENSON, Alan	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:
 08 January 2001 (08.01.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Zakaria EL KHODARY Telephone No.: (41-22) 338.83.38
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INTERNATIONAL COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference AS-4	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 02298	International filing date (day/month/year) 14/06/2000	(Earliest) Priority Date (day/month/year) 17/06/1999
Applicant STEPHENSON, Alan		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☒ because this figure better characterizes the invention.

1, 6

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No.

GB 00/02298

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F16B13/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 044 512 A (FISCHER ARTUR ET AL) 30 August 1977 (1977-08-30) column 5, line 1-10 column 5, line 40,41 column 8, line 6 -column 9, line 2 figures 11,12 ---	1
A	GB 2 207 726 A (SILVERMAN GEOFFREY MAYER) 8 February 1989 (1989-02-08) page 1, line 21 -page 2, line 11 page 2, line 31 -page 3, line 11 figure 1 --- -/--	1-3,21

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

22 September 2000

Date of mailing of the international search report

04/10/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Van Wel, O

INTERNATIONAL SEARCH REPORT

International Application No.

GB 00/02298

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE 296 17 495 U (PALACKY ALOIS) 28 November 1996 (1996-11-28) page 1, line 1 -page 2, line 13 page 3, line 25-34 page 7, line 32 -page 8, line 15 figures 1,6 ---	1,3-6, 10,21
A	DE 24 13 479 A (NEUMANN & CO GMBH) 10 October 1974 (1974-10-10) page 4, line 1-27 figures 1,3 ---	1,3,7, 10,11, 13,21-23
A	DE 629 335 C (G. JARECKI) 28 April 1936 (1936-04-28) page 1, line 59 -page 2, line 33 figures 1-3 -----	1,4-6,8, 10,13, 14,16, 21,22

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 00/02298

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4044512	A	30-08-1977	DE 2453957 A	20-05-1976
			DE 2523198 A	02-12-1976
			DE 2525220 A	23-12-1976
			DE 2525452 A	16-12-1976
			DE 2526744 A	23-12-1976
			DE 2527773 A	30-12-1976
			DE 2541762 A	24-03-1977
			DE 2547823 B	31-03-1977
			DE 2548979 A	05-05-1977
			DE 2550954 A	18-05-1977
			AR 207487 A	08-10-1976
			AT 348733 B	26-02-1979
			AT 349193 B	26-03-1979
			AT 340657 B	27-12-1977
			AT 865275 A	15-04-1977
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			AU 1774076 A	23-03-1978
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			DD 121149 A	12-07-1976
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			DK 511275 A, B,	15-05-1976
			ES 442525 A	16-04-1977
			FR 2291394 A	11-06-1976
			FR 2324925 A	15-04-1977
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			GB 1561768 A	05-03-1980
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			HU 171898 B	28-04-1978
			IL 48469 A	30-04-1978
			IT 1048678 B	20-12-1980
			JP 1191001 C	29-02-1984
			JP 57040045 A	05-03-1982
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			JP 52038729 A	25-03-1977
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			JP 51072858 A	24-06-1976
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DE 29617495	U	28-11-1996	CZ 9602696 A	18-03-1998
DE 2413479	A	10-10-1974	AT 318690 B	11-11-1974
			AT 305329 B	15-01-1973
			AT 297078 B	15-02-1972

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

GB 00/02298

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 2413479 A		BE 812718 A	15-07-1974
		CH 565897 A	29-08-1975
		DD 113048 A	12-05-1975
		ES 424493 A	01-07-1976
		GB 1459875 A	31-12-1976
		IT 1046563 B	31-07-1980
		RO 64642 A	29-04-1983
		SE 398915 B	23-01-1978
		SU 545268 A	30-01-1977
		YU 76974 A	30-06-1981
		CH 514734 A	31-10-1971
		DE 1948339 A	17-12-1970
		ES 371809 A	16-10-1972
		FI 58374 B	30-09-1980
		FR 2019027 A	26-06-1970
		GB 1289718 A	20-09-1972
		JP 49032808 B	03-09-1974
		NL 6914726 A	01-04-1970
		NO 128623 B	17-12-1973
		SE 364350 B	18-02-1974
		YU 242169 A, B	28-02-1979
		BE 739467 A	02-03-1970
		SU 519143 A	25-06-1976
DE 629335 C		NONE	

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference AS-4	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/02298	International filing date (day/month/year) 14/06/2000	Priority date (day/month/year) 17/06/1999
International Patent Classification (IPC) or national classification and IPC F16B13/14		
Applicant STEPHENSON, Alan		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 08/01/2001	Date of completion of this report 12.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Hunter, E Telephone No. +49 89 2399 2941



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02298

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-13 as originally filed

Claims, No.:

1-25 as originally filed

Drawings, sheets:

1/2,2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/02298

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims
	No:	Claims 1,10,22
Inventive step (IS)	Yes:	Claims
	No:	Claims 1-20,22-25
Industrial applicability (IA)	Yes:	Claims 1-25
	No:	Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/02298

V

Document DE-A-629335, D1, discloses a method of securing a plug in a hole, comprising providing a fabric containing a filler, the fabric enveloping the plug, activating the filler and inserting the plug. This document therefore discloses all the features of claim 1.

In this connection it is noted that D1 refers to the fixing of screws, nails and hooks and the like in a pre-formed hole. These members are "plugs" in that they plug the hole. The term "plug" in claim 1 therefore does not per se provide novelty.

Similarly, D1 discloses all the features of claim 10 directed to a means, and claim 22 directed to a unit.

The dependent claims 2-9, 11-20, 23-25 do not appear to contain any additional features which involve an inventive step, since the features of these claims, ie. the additional features of the dependent claim together with those of the claim(s) on which said dependent claim is dependent, are either known from the documents of the search report or are features which the man skilled in the art can be expected to consider in the course of his normal activity and to apply according to requirements.

The combination of features set out in claim 21, in which a screw is inserted into the plug, is not disclosed in, or suggested by the documents specified in the search report.

VII

The independent claims are not cast in the two-part form, with those features which in combination are part of the prior art being placed in the preamble, Rule 6.3 (b).

The most relevant documents of the search report are not identified and evaluated in the description, Rule 5.1(a)(ii).

VIII

The sequence of method steps in claim 2 which is dependent on claim 1, appears contradictory to that of claim 1. This does not comply with Art 6 PCT regarding clarity.

Claims 24 and 25 referring to the description and drawings do not comply with Rule 6.2a PCT.

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 December 2000 (28.12.2000)

PCT

(10) International Publication Number
WO 00/79139 A1

(51) International Patent Classification⁷: **F16B 13/14**

(21) International Application Number: PCT/GB00/02298

(22) International Filing Date: 14 June 2000 (14.06.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
9913987.5 17 June 1999 (17.06.1999) GB

(71) Applicant and

(72) Inventor: STEPHENSON, Alan [GB/GB]; 39 Horton Road, Datchet, Berkshire SL3 9EP (GB).

(74) Agent: SENHENN, Derek, Alan; 50 Gerard Road, Barnes, London SW13 9QQ (GB).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

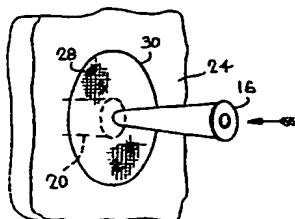
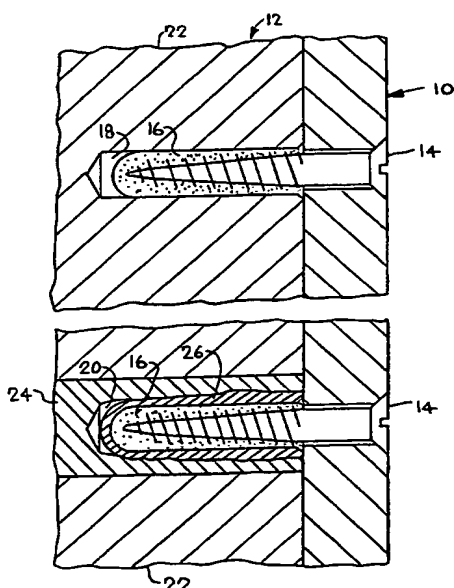
(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SECURING PLUG IN OVER-SIZED HOLES



(57) Abstract: A method of securing a screw-receiving plug (16) in an over-sized preformed hole (20) comprises the steps of: (a) providing at least one piece of a loosely-woven fabric (26, 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26, 30) is sized to envelop at least circumferentially the plug (16) intended to be used; (b) enveloping the plug (16) circumferentially in the fabric piece (26, 30); (c) activating the filler material (28); and (d) inserting the enveloped plug (16, 26, 28) in the hole (20) in a manner such as to ensure filling of the hole (20) with the enveloped plug (16, 26, 28). In one embodiment the filler material (28) is water-activated, e.g. a quick-setting material made from gypsum, preferably plaster of Paris; whilst in a second embodiment the filler material is air-activated, e.g. a polyurethane resin. The method enables a screw (14) to be screwed home in the plug (16) after elapse of a short filler-hardening time. The fabric piece (26) may comprise a tape (38) for winding on the plug (16) circumferentially; or it may be circular in shape, and be placed over the closed end of the plug (16) and then smoothed longitudinally along the plug (16).

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SECURING PLUGS IN OVER-SIZED HOLES

This invention relates to a method of securing plugs (particularly but not exclusively screw-receiving plugs) in oversized holes formed in fixtures, - thereby to enable, for example, screws, bolts or even nails to be secured in a fixture. The invention also provides means for use in carrying out that method.

10 In the description and claims that follow hereafter, the term "screws" will include "bolts" as well, and will encompass screws that have screw-threaded cylindrical shanks as well as screws having screw-threaded conical shanks.

15 Devices and appliances are frequently secured to a supporting fixture or structure (e.g. a wall, cabinet or panel) by means of screws. In some cases, such screws cannot be screwed directly into the structure because of the nature of the material of the structure, but instead are inserted into a plug of a screw-receiving material that has been previously inserted in a frictionally-engaging manner in a hole preformed in the structure. Driving the screw into the plug tends to radially enlarge the plug, thus causing the frictional engagement of the plug with the structure to intensify and thereby resist both longitudinal and rotational displacement of the plug within the hole as the screw is driven home to firmly secure the device or appliance to the structure.

30 Difficulties can arise in preforming the hole in the structure, for example - where the material of the structure is not homogeneous, or is easily eroded non-uniformly during the drilling of the hole. As a result, the hole is sometimes larger than desired (and/or misshapen) for the size of the plug intended to be engaged therein. This happens for example where the hole is being drilled in mortar bonds between bricks.

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In such cases remedial measures may include using a larger plug to receive the plug or screw originally intended to be used, or simply a larger screw; or alternatively filling the over-sized hole with a suitable homogeneous plastic filler material, and then redrilling the necessary plug-receiving hole in the filler material after it has hardened.

Unfortunately, the latter procedure unduly prolongs the time of securing the screw since the hardening of the filler material requires a relatively long setting time before it can safely carry a load, because of the bulk of the filler material to be hardened, and its almost complete enclosure in the hole. Suitable plastic fillers include epoxy resins, but they are relatively expensive, require special mixing procedures, have long hardening times, and can present problems in safe handling and storage, e.g. dermatological problems for the user.

The present invention seeks to provide a method and means for enabling plugs (e.g. screw-receiving plugs) to be secured in circumstances where the preformed hole is unfortunately enlarged beyond the intended size, which method and means do not require resort to the use of a larger plug or screw, or a long filler-hardening time.

According to the present invention, a method of securing a plug, for example a screw-receiving plug, in an over-sized preformed hole comprises the steps of: (a) providing at least one piece of a loosely-woven fabric carrying consolidated thereon a quick-setting filler material, which fabric piece is sized to envelop at least circumferentially the plug intended to be used; (b) enveloping the plug at least circumferentially in the fabric piece; (c) causing activation of the filler material thereby to initiate hardening and eventual setting of the filler material; and (d) inserting the enveloped plug without delay in the oversized hole in a manner such as to ensure filling of the

-3-

oversized hole with the enveloped plug. After the elapse of a relatively short filler-hardening time, the intended screw (or nail) may be inserted in and screwed into the plug.

5

By the term "loosely-woven fabric" is meant any fabric whether woven or knitted which is capable of constituting an open matrix material or substrate on to which the filler material may be consolidated or impregnated. This term shall be construed broadly in this manner wherever appropriate in this description and in the appended claims. Such a fabric may comprise for example a gauze material or a leno weave material.

10

Where the filler material requires activation by air, as in the case of some synthetic resin filler materials e.g. a polyurethane resin, activation will commence at the moment of releasing the fabric from an airtight storage container, so that enveloping the plug in the fabric occurs shortly after air activation has started.

20

Where the filler material requires activation by water, as in the case of one preferred filler material, for example plaster of Paris, activation is achieved by wetting the enveloped plug with water.

25

Enveloping the plug in the filler impregnated-fabric provides a reliable method of ensuring that sufficient filler material is carried with the plug into the hole to its fullest extent. This is extremely difficult to achieve without the fabric carried on the plug, so that safe securing of the plug in the oversized hole is then unpredictable and unreliable.

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Water-activated filler materials have the advantage compared with the air-activated filler materials that they are relatively cheap and plentiful, and give rise to few dermatological problems for the user.

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-4-

The preferred water-activated filler material comprises plaster of Paris, though any other suitable filler material manufactured from gypsum will suffice.

5 If desired, the filler material may have mixed with it short, strength-enhancing fibres of glass, carbon or other suitable material.

10 The fabric piece may be in the form of a tape or strip, and be wound on to the plug thereby to envelop it circumferentially. Alternatively, the fabric piece may be circular in shape, or substantially so, and be placed over the closed end of the plug and then smoothed longitudinally along the plug to the open end thereof so as to envelop it
15 circumferentially in a substantially uniform manner.

According to a further aspect of the invention, there is provided for use in the method of the present invention a piece of a loosely-woven fabric carrying consolidated
20 thereon a quick-setting filler material, which fabric piece is in the form of a tape which is transversely weakened at positions spaced along the tape so as to enable ready detachment of successive pieces as desired for use in practising a method according to the present invention.

25 Said filler material may, if desired, have mixed with it short, strength-enhancing fibres of glass, carbon or other suitable material.

30 The tape may be wound in the form of a roll, or alternatively it may be folded upon itself at said weakened positions in a fan-fold manner.

Where air-activated filler material is used, it is
35 essential to enclose the fabric tape in an air-tight enclosure to prevent activation until the tape is about to be put into use.

-5-

Where water-activated filler material is used, it is necessary to enclose the fabric tape in a watertight enclosure so as to ensure its storage in a dry condition prior to use.

5

The present invention also provides for use in the method of the present invention an enclosure containing a selection of separate filler-carrying fabric pieces of substantially circular or rectangular configuration, which pieces may be all of one size, or of various sizes to suit different plug sizes.

10

Preferably, the airtight and watertight enclosures incorporate appropriate resealing means for maintaining respectively the airtightness and watertightness of the respective enclosures, and contain or carry printed instructions setting out the manner of using the fabric pieces in accordance with the present invention.

15

According to another aspect of the present invention, there are provided for use in carrying out the present invention ready-made (pre-prepared) units each comprising a said plug having secured therearound a sleeve (preferably closed at one end) of a said loosely-woven fabric carrying consolidated thereon a said quick-setting filler material, with or without said strength-enhancing fibres. Such fabric may be retained on the plug by being impaled on radial, retaining projections such as are commonly formed on screw-receiving plugs, or by an adhesive substance.

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-6-

Other features of the present invention will appear from a reading of the description that follows hereafter and of the claims appended at the end of that description.

5 Various methods incorporating the present invention, of securing screws in a fixture, and means for use in practising those methods, will now be described by way of example, and with reference to the accompanying drawings, in which:

10 Figure 1 shows a vertical sectional view of part of an appliance secured to a vertical brick wall by conventional wood screws, the section being taken in the plane including the longitudinal axes of two screws;

15 Figures 2 and 3 show respectively rectangular and circular pieces of a woven fabric carrying an embedded filler material;

20 Figure 4 shows in a pictorial manner a plastic screw-receiving plug around which is being wound the rectangular fabric piece of Figure 2;

25 Figure 5 shows in a pictorial manner a plastic screw-receiving plug along which is being pressed and smoothed the circular fabric piece of Figure 3;

30 Figure 6 shows in a pictorial manner a plastic screw-receiving plug about to be forced longitudinally along with a circular fabric piece of Figure 3 into a hole preformed in the brick wall;

35 Figure 7 shows in a pictorial manner a resealable water-proof enclosure containing several rectangular filler-carrying fabric pieces of the kind shown in Figure 2;

Figure 8 shows in a pictorial manner a filler-carrying woven fabric tape for use in providing as required

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detachable rectangular fabric pieces of the kind shown in Figure 2, the tape being wound in the form of a roll;

5 Figure 9 shows in a pictorial manner a filler-carrying woven fabric tape for use in providing as required detachable rectangular fabric pieces of the kind shown in Figure 2, the tape being folded in a fan-fold manner; and

10 Figure 10 shows in a pictorial manner a ready-made unit comprising a conventional plastic, screw-receiving plug such as is shown in Figures 4 and 5, having secured thereon a sleeve of a said loosely-woven fabric carrying an embedded filler material similar to the fabrics shown in the Figures 2 and 3.

15 Referring now to the drawings, an appliance 10 is to be secured to a brick wall structure 12 in the manner shown in Figure 1, by means of so-called 'wood screws' (i.e screws having screw-threaded conical shanks) 14, using plastic
20 plugs 16 of conventional kind disposed in suitably positioned holes 18,20 preformed in the brick wall 12.

The intended positions of some of those holes (18) require drilling in the material of the bricks 22 themselves, so
25 that no difficulty is normally encountered in drilling them to a diameter that is correct for the intended plastic plugs.

30 However, the intended positions of other holes (20) coincide with respective mortar bonds 24 disposed between adjacent bricks 22. Due to the weakness of the mortar often used in such bonds 24, or the presence of small chippings or pebbles in the mortar, drilling of those holes
35 20 with the requisite masonry drill can result in holes that are somewhat oversized and/or badly mis-shapen, as indicated in Figure 1. As a consequence, the intended plastic plugs 16 are too small in diameter to frictionally engage with the encircling mortar, and so cannot receive

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and secure the screws intended to be engaged in the plugs. Hence, when a fixing screw 14 is presented to the plug 16 and rotated, the screw and the plug rotate together.

5 In a first embodiment of the present invention, this difficulty is overcome, in accordance with the principles of the present invention, by providing for each such oversized or mis-shapen hole 20 at least one piece 26 of a loosely-woven fabric (for example - cotton) carrying
10 consolidated thereon a dry, water-activated, quick-setting filler material 28 (for example - plaster of Paris). Each such fabric piece 26 is sized to be capable of enveloping circumferentially at least a major part of the intended plastic plug 16 when engaged therearound.

15 The method of the present invention now involves for each plug 16 to be secured in a defective (i.e. over-sized or mis-shapen) hole 20, engaging one such fabric piece 26 securely around the plastic plug 16 so as to closely
20 envelop it circumferentially along its length.

The fabric piece 26 and filler material 28 are then wetted with water so as to activate the filler material 28, and thereby initiate its setting (hardening) process.

25 The wetted, enveloped plug (16,26,28) is then inserted without delay into the defective hole 20 so as to substantially fill it, the fabric piece 26 and filler material 28 then occupying the spaces between the plug 16
30 and the bore of the hole 20.

After the elapse of the requisite (relatively short) filler-hardening time, the intended screw 14 is inserted in and screwed into the plug 16. The whole process may
35 require only as little as five minutes.

Final tightening of the screw with the appliance in position is normally and preferably delayed for a few

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minutes further, up to a total of ten minutes setting time.

5 The fabric piece 26 may be in the form of a short tape or strip as indicated in Figure 2, and be wound around the plug in the manner shown in Figure 4 thereby in effect to enlarge its diameter.

10 Alternatively, and preferably, the fabric piece is in the form of a circular disc 30 as shown in Figure 3, in which case the disc 30 may be placed against the closed end of the plastic plug 16 and then be smoothed axially along the length of the plug as indicated in Figure 5, thereby to achieve a substantially uniform close engagement of the fabric piece around the plug.

15 An alternative procedure may be used instead if desired. Instead of applying the fabric piece 30 (or even 26) to the plug 16, then wetting it and forcing the plug enveloped in the fabric piece into the hole 20, the fabric piece 30 is first wetted to start the hardening process, and then
20 placed centrally over the defective hole 20, as shown in Figure 6, whereafter the plug 16 is pressed against the centre of the fabric piece thereby to carry the fabric piece with the plug as it is forced longitudinally into the defective hole, the fabric piece and filler material again
25 filling the spaces between the plug 16 and the hole 20. Any unwanted parts of the fabric which protrude from the hole may be trimmed away with scissors or a craft knife.

30 Whilst in Figure 3 the fabric piece 30 is circular in shape (as preferred), other quasi-circular shapes (polygonal for example) may be used instead, and even substantially square fabric pieces.

35 Where the oversizing of the drilled hole 20 is substantial, it may require the use of two (or possibly more) fabric pieces 26 or 30 lying on top of one another to provide the requisite amount of fabric and filler material to fill the

-10-

spaces between the hole 20 and the plug 16. In this case, the process may require a slightly longer time (possibly as much as ten minutes) to achieve satisfactory securing of the plug, depending on how oversized the hole 20 is and thus how many pieces of filler-carrying fabric 26 or 30 needed to be used.

For use in practising the method of the present invention, there may be provided in a suitable water-proof package 32 a plurality of fabric pieces 26 or 30 of similar sizes, or as desired - assorted sizes. The fabric pieces may be separate one from another, ready for withdrawal one by one from the package.

Alternatively, the package 32 may enclose filler-carrying fabric in the form of a tape (or strip) 34, which tape has been weakened transversely (e.g. by perforations) at positions 36 spaced along the length of the tape so as to enable separate pieces 38 of the tape to be readily detached. For convenience the tape may be wound in the form of a roll 40 as shown in Figure 8. Alternatively, the tape may be folded repeatedly upon itself at the weakened positions 36 and packaged in fan-fold manner, as shown at 42 in Figure 9.

The packages preferably include closure means (not shown) for resealing them in a water-proof manner after withdrawing a fabric piece.

Preferably, the packages carry within them or externally thereon a set of instructions for using the enclosed fabric pieces in accordance with the principles of the present invention.

It will be appreciated that the method of the present invention may be used in any situation where a plastic (or other) plug has to be disposed in any larger-than-desired hole.

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Whilst the above description is directed to the securing of a wood screw in a plastic plug, the procedure described there is equally applicable to the securing of such a screw in any form of plug, whether it be of a plastics material, wood, or a metal. Furthermore, the procedure may be used in the same manner for securing plug devices intended for use with plasterboard panels, or for plugs intended to receive nails (instead of screws).

Moreover, the procedure described above may equally be used in respect of a bolt having a screw-threaded cylindrical shank and intended to form part of a masonry bolt device, or part of a plug device intended for use with plasterboard panels.

By quick-setting filler material is meant material that has typically a setting time of up to about ten minutes.

Fabric for use in practising the present invention may comprise fibres of cotton, or any suitable synthetic plastics material (e.g. polypropylene), or even carbon or glass, and may be woven or knitted in any suitable manner, regularly or randomly. Fabric of the kind known as "leno" weave fabric is particularly suitable. Gauze fabrics are also useful in the present context.

The quick-setting filler material may be any suitable material derived from gypsum, and which can be consolidated on and/or within the interstices of the woven fabric. Other water-activated filler materials may be used instead. If desired, short (preferably less than 5mm in length), strength-enhancing fibres of glass, carbon or other suitable material may be mixed in with the filler material.

For convenience of the user, there may be provided, and marketed as such, ready-made (pre-prepared) units (Figure 10) each comprising a screw-receiving plug, carrying thereon a sleeve, preferably closed at one end,

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of a loosely-woven fabric having consolidated thereon a said dry, water-activated, quick-setting filler material. The plug is similar to that shown (16) in the Figures 3 and 4, whilst the fabric and filler are similar to those (26-30) used in the Figures 2 and 3. The sleeve 46 is retained on the plug 16 by radial retaining projections 48 formed on the plug (also seen in Figures 4 and 5); if desired the sleeve may be secured instead by an adhesive.

One form of water-activated filler-carrying fabric (as referred to above) is currently used in the medical field, for the making of splints and casts. For example, plaster of Paris bandage commercially available under the trade mark "GYPSONA" from the company 'Smith and Nephew' has been successfully used in experiments with methods according to the present invention. It is described as comprising a 'leno weave gauze cotton' which carries gypsum.

Methods according to the above-described embodiment of the present invention have the advantages that they are simple, involve only simple non-damaging chemical materials, and are relatively swift to practise.

In a second embodiment of the present invention, the method of securing the plug 16 in the hole 20 is generally similar to that described in the above-described first embodiment, with the exception that the filler material 28 comprises instead an air-activated synthetic resin material, e.g. polyurethane resin. In this case activation of the filler material starts with the withdrawal of the filler-impregnated woven fabric 26,28 from its air-tight storage enclosure. Hence, there should be no appreciable delay in inserting the plug 16 with its enclosing filler-impregnated fabric 26,28 into the hole 20.

There is likewise currently available for use in the medical field, for the making of splints and casts, a loosely-woven fabric 26 carrying an air-activated filler

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material 28. That material is currently available under the trade name "DYNACAST EXTRA" from the company 'Smith & Nephew'. It is described as comprising a 'fibreglass knitted substrate' carrying a filler material comprising 'low tack polyurethane resin'. This second material has been successfully used in experiments concerning the present invention.

This second embodiment has the disadvantage compared with the first embodiment that the woven fabric carrying the resin filler material is relatively expensive, may adversely affect the user's skin, and needs greater care in handling it because of its sensitivity to air, which could result in premature hardening of the filler material before being brought into use.

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CLAIMS

1. A method of securing a plug (16) in an over-sized preformed hole (20) comprises the steps of: (a) providing
5 at least one piece of a loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is sized to envelop at least circumferentially the plug (16) intended to be used; (b) enveloping the plug (16) at least
10 circumferentially in the fabric piece (26 or 30); (c) causing activation of the filler material (28) thereby to initiate hardening and eventual setting of the filler material (28); and (d) inserting the enveloped plug (16,26,28) without delay in the oversized hole (20) in a
15 manner such as to ensure filling of the oversized hole (20) with the enveloped plug (16,26,28).

2. A method according to claim 1, wherein the filler material (28) is air activated, and step (c) precedes step
20 (b).

3. A method according to claim 2, wherein the filler material comprises a polyurethane resin.

25 4. A method according to claim 1, wherein the filler material (28) is water activated, and step (b) precedes step (c).

30 5. A method according to claim 4, wherein the filler material comprises plaster of Paris.

6. A method according to claim 4, wherein the filler material (28) comprises a quick-setting material manufactured from gypsum, other than plaster of Paris.

35 7. A method according to any one of the claims 1 to 6, wherein the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other

-15-

suitable material.

8. A method according to any one of the claims 1 to 7, wherein the fabric piece (26) is in the form of a tape or strip, and is wound on to the plug (16) thereby to envelop it circumferentially.

9. A method according to any one of claims 1 to 7, wherein the fabric piece (30) is circular in shape, or substantially so, and is placed over the closed end of the plug (16) and then smoothed longitudinally along the plug (16) to the open end thereof so as to envelop the plug (16) circumferentially in a substantially uniform manner.

10. Means for use in practising a method according to any preceding claim, comprising a piece of a loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is shaped and sized for use with a plug of a particular selected size.

11. Means according to claim 10, wherein the the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other suitable material.

12. Means according to claim 10 for use in a method according to claim 9, wherein the piece of filler-carrying fabric (30) is circular in shape, or substantially so.

13. Means according to claim 10 for use in a method according to claim 8, wherein the piece of filler-carrying fabric (26) is rectangular in shape, or substantially so.

14. Means for use in practising a method according to any one of the claims 1 to 8, comprising a piece of a loosely-woven fabric (26 or 30) carrying consolidated thereon a quick-setting filler material (28), which fabric piece (26 or 30) is in the form of a tape (34) which is transversely

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weakened at positions (36) spaced along the tape (34) to enable ready detachment of successive pieces (38) as desired for use in practising any of the methods.

5 15. Means according to claim 14, wherein the the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other suitable material.

10 16. Means according to claim 14, wherein the tape (34) is wound in the form of a roll (40).

15 17. Means according to claim 14, wherein the tape (34) is folded upon itself at said weakened positions (36) in a fan-fold manner.

18. Means according to any one of the claims 10 to 17, wherein the filler-carrying fabric piece or pieces (26,30,38) are enclosed in an enclosure means (32) arranged to prevent premature activation of the filler material.

20 19. Means according to claim 18, wherein the enclosure means (32) incorporates a resealable closure means for enabling withdrawal of individual fabric piece (26,30,38) one at a time.

25 20. Means according to claim 18 or 19, wherein the enclosure means (32) carries within or externally thereon printed instructions setting out the manner of using the fabric pieces.

30 21. A method of securing a screw (14) in an over-sized preformed hole (20) comprising a method according to any one of the claims 1 to 9, and a subsequent step, after the elapse of the requisite filler-hardening time, of inserting
35 the screw (14) in the plug (16) and screwing it home therein, the screw (14) being of a size intended for the size of the plug (16).

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22. For use in any one of the methods of claim 1 to 9, a pre-prepared unit (44) comprising a plug (16) carrying around it a sleeve of a loosely-woven fabric having consolidated thereon a quick-setting filler material (28).

5

23. A unit according to claim 22, wherein the the filler material has mixed in with it short, strength-enhancing fibres of glass, carbon or other suitable material.

10

24. A method according to any one of the claims 1 to 9 and 21, substantially as hereinbefore described with reference to, and as illustrated by, the accompanying diagrammatic drawings.

15

25. Means according to any one of the claims 10 to 20, 22 and 23, substantially as hereinbefore described with reference to, and as illustrated by, the accompanying diagrammatic drawings.

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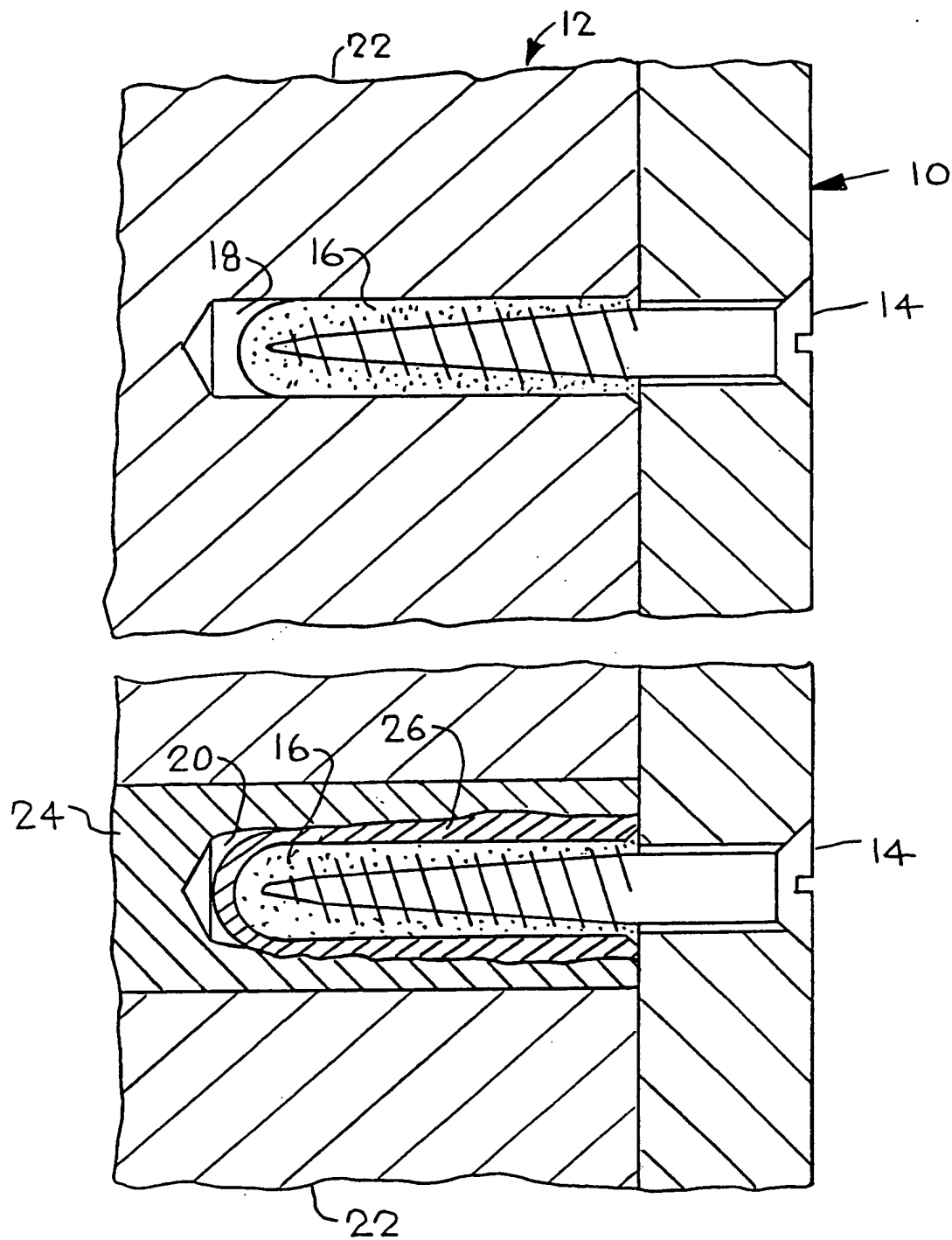


FIG. 1

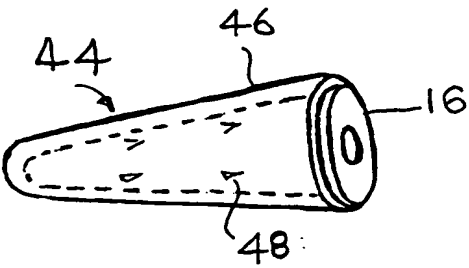
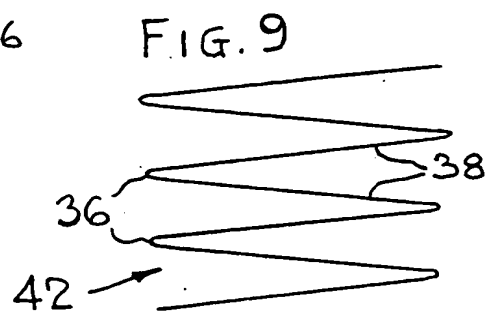
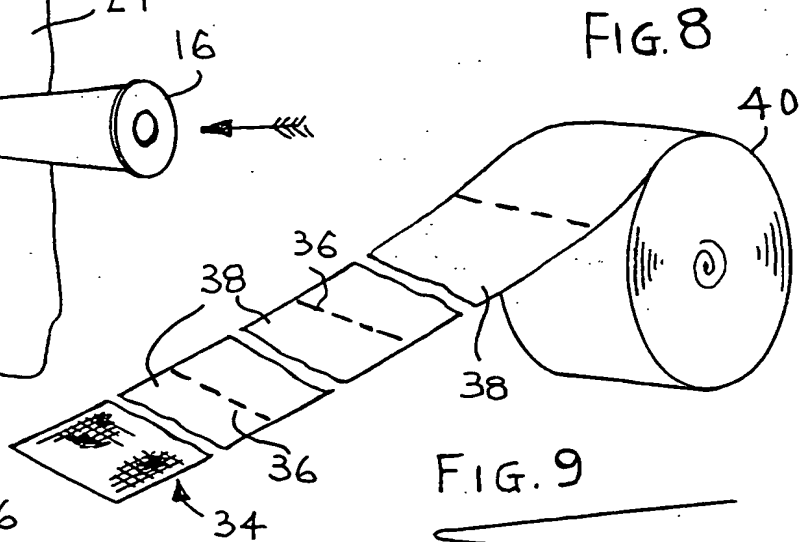
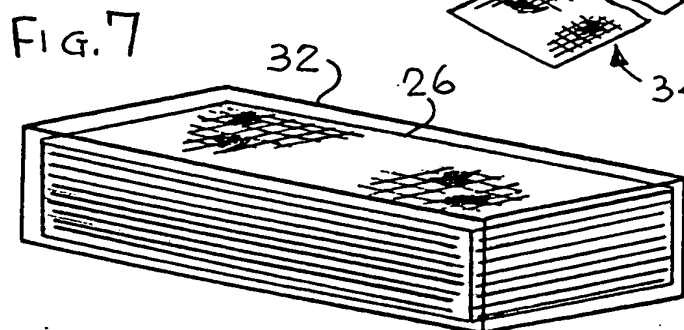
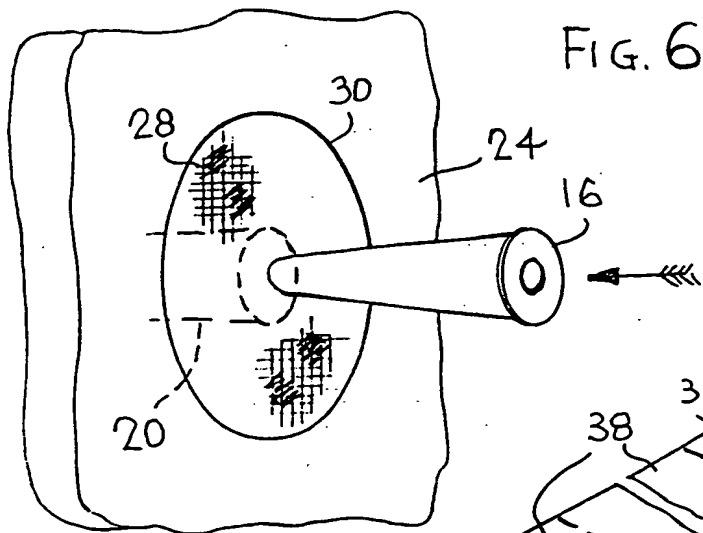
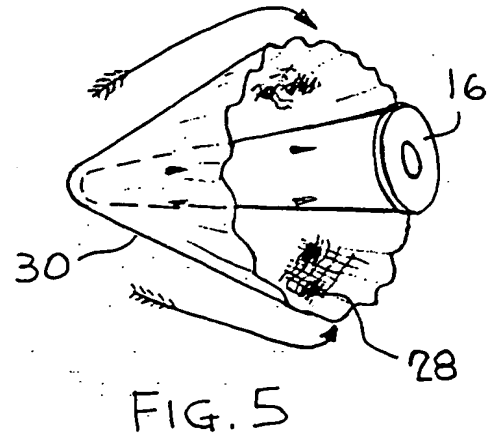
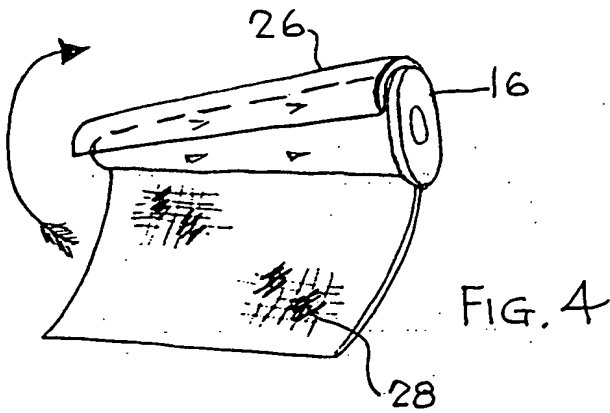
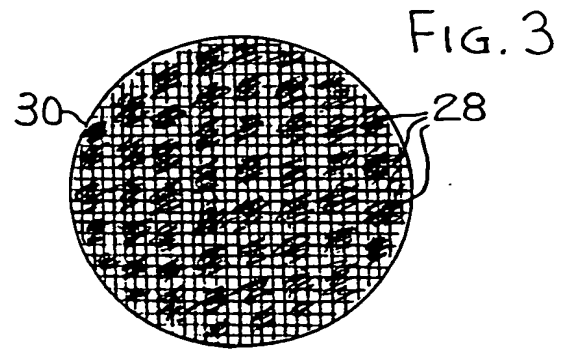
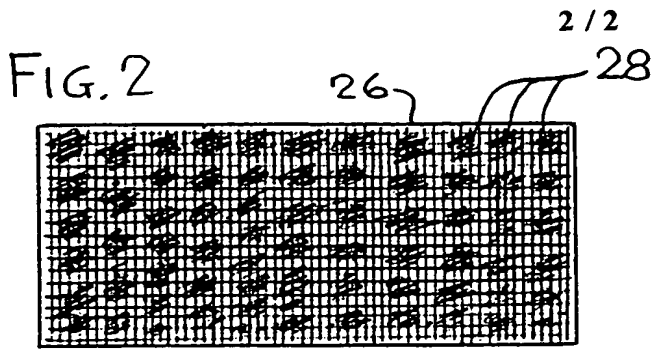


FIG.10



INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02298

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F16B13/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F16B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 044 512 A (FISCHER ARTUR ET AL) 30 August 1977 (1977-08-30) column 5, line 1-10 column 5, line 40,41 column 8, line 6 -column 9, line 2 figures 11,12	1
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Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Van Wel, O

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 00/02298

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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